WHAT IS CLAIMED IS:

1. A method of producing an SOI wafer in which an SOI layer is formed on a buried oxide film by, at least implanting at least one kind of ion of hydrogen ion and a rare gas ion into the surface portion of a bond wafer to form an ion-implanted layer, bonding the bond wafer and a base wafer to each other through an oxide film, and delaminating the resultant bonded wafer at the ion-implanted layer, wherein assuming that X [nm] represents the thickness of the buried oxide film and Y [nm] represents the thickness of the SOI layer in the SOI wafer immediately after delaminating at the ion-implanted layer, when the thickness X of the buried oxide film is $X \leqq 100$, in forming the ion-implanted layer, the ion implantation is carried out with the ion implantation conditions being set such that the sum X + Y of the thickness of the buried oxide film and the thickness of the SOI layer satisfies $Y > 1500 - 14X$, after which the bonding process and the delaminating process are carried out and, thereafter, a thinning treatment of the SOI layer is carried out to make the SOI layer into a thin film having a predetermined thickness.

2. The method of producing an SOI wafer according to claim 1, wherein in forming the ion-implanted layer, the ion implantation is carried out with the ion implantation conditions being set such that the sum X + Y of the

thickness of the buried oxide film and the thickness of the SOI layer becomes 390nm or more when the thickness X of the buried oxide film is made into $80 \leqq X \leqq 100$, such that X + Y becomes 810nm or more when X is made into $50 \leqq X < 80$, and such that X + Y becomes 1090nm or more when X is made into $30 \leqq X < 50$.

3. The method of producing an SOI wafer according to claim 1, wherein the thinning treatment of the SOI layer is carried out by a sacrificial oxidation treatment.

4. The method of producing an SOI wafer according to claim 2, wherein the thinning treatment of the SOI layer is carried out by a sacrificial oxidation treatment.

5. An SOI wafer produced by the method of producing an SOI wafer according to claim 1.

6. An SOI wafer produced by the method of producing an SOI wafer according to claim 2.

7. An SOI wafer produced by the method of producing an SOI wafer according to claim 3.

8. An SOI wafer produced by the method of producing an SOI wafer according to claim 4.